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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/016,812

11/30/2001

Bin Zhao

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06/03/2004

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EXAMINER

CURTIS, CRAIG

ART UNIT

PAPER NUMBER

2872

DATE MAILED: 06/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/016,812

Applicant(s)

ZHAO, BIN

Examiner

Craig Curtis

Art Unit

2872

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 March 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 2, 7-16, 18, 20 and 21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 7-16, 18, 20, and 21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

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DETAILED ACTION

Disposition of the Instant Application

- This Office Action is responsive to Applicant's Amendment of 5 March 2004, which has been entered.
- By this amendment, Applicant has canceled claims 3-6, 17, and 19, and has amended claims 1, 16, 18, 20, and 21.
- Applicant's Terminal Disclaimer, filed on 5 March 2004, has been disapproved. It appears that Applicant inadvertently cited the serial number of the instant application (i.e., 10/016,812) instead of the pending application (i.e., 09/891,795) that was asserted in the provisional double-patenting rejection. It is also noted that no fee payment (\$55.00) has been received. Said provisional double-patenting rejection will remain in effect pending the submission by Applicant of a corrected terminal disclaimer.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

1. **Claims 1, 2, 7-16, 18, 20, and 21 are rejected under 35 U.S.C. 112, first paragraph, as being based on a disclosure that is not enabling.** More specifically, in each of independent claims 1, 16, 18, 20, and 21, the following limitation is recited: "...wherein the spatial birefringent element

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first separates an optical beam into two orthogonally polarized components, each of the two components travels along separate paths of different optical path length such that when the two components recombine at the output of the spatial birefringent element[,] a birefringent effect is achieved...." The structural limitations required to accomplish said birefringent effect, which is critical and/or essential to the practice of the invention, have not been included in the claim(s), and as such, said recitation is not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976). Applicant is respectfully requested to amend the claims such that this recitation be enabled, by, for example, reciting specific birefringent elements, apart from the presently recited spatial birefringent element, in a logical order.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1, 2, 7-16, 18, 20, and 21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. More specifically, the meaning of the recitation "*...such that when the two components recombine at the output of the spatial birefringent element a birefringent effect is achieved.*" (Emphasis added.) That is, which specific birefringent effect does Applicant intend to convey...phase change, separation of orthogonal polarization states, etc.?

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Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371 of this title before the invention thereof by the applicant for patent.

3. Claims 1, 7, 8, 10, 12-14, 16, 18, and 21 are rejected under 35 U.S.C. 102(e) as being anticipated by Chang et al. (6,335,830).

With regard to claim 1, Chang et al. disclose (with reference to Fig. 4a) the invention as claimed--An interleaver comprising:

a birefringent element assembly (the system depicted in Fig. 4a) comprising at least one spatial birefringent element (e.g., 400, 492, 490), the birefringent element assembly providing two output components. See, e.g., output components from spatial birefringent element 400;

a reflector (450 and/or 452 and/or 472) configured to direct said two components from the birefringent element assembly back through the birefringent element assembly. See Fig. 4a.; esp. outputs 493 and 495;

wherein the spatial birefringent element (identified as above) first separates an optical beam (404) into two orthogonally polarized components, each of the two components traveling along

separate paths of different optical path lengths (see element 400) such that when the two components recombine at the output of the spatial birefringent element a birefringent effect is achieved (in the same manner as that achieved by the instant invention).

With regard to claim 7, Chang et al. also teach wherein said birefringent element assembly comprises a plurality of spatial birefringent elements. See elements 492, 400, and 490.

With regard to claim 8, Chang et al. is taken to meet the recited limitations wherein said birefringent element assembly comprises a first birefringent element having an equivalent angular orientation of ϕ_1 (viz., 402) a second birefringent element having an equivalent angular orientation of ϕ_2 (viz., 410), and a third birefringent element having an equivalent angular orientation of ϕ_3 (viz., 430) (it being noted that as presently recited, equivalent angular orientations ϕ_1 , ϕ_2 , and ϕ_3 can be either identical to or distinct from one another); wherein an order of the first birefringent element, second birefringent element, and third birefringent element is (selected from the group consisting of):

first birefringent element, second birefringent element, and third birefringent element.

With regard to claim 10, Chang et al. teach wherein said birefringent element assembly comprises two birefringent elements (e.g., elements 494, 496).

With regard to claim 12, Chang et al. teach wherein the birefringent element assembly and the reflector are configured so as to facilitate interleaving of a plurality of input light beams

simultaneously. See plurality (read: two or more) of beams propagating through said birefringent element assembly in Fig. 4a.

With regard to claim 13, Chang et al. teach wherein each spatial birefringent element (viz., elements 400, 490, and 492) defines two light paths (see Fig. 4a), each light path having a different optical path length (inherent) and wherein a difference in optical path length between said two paths is provided by a material having an index of refraction greater than one which [read: that] is disposed within at least a portion of one of the first and second paths (inherent). See Fig. 4a.

With regard to claim 14, the nature of said spatial birefringent elements taught by Chang et al. is such that (as set forth above) each spatial birefringent element defines two light paths and wherein an index of refraction is different for at least a portion of at least one of the two light paths so as to cause said two light paths to have different optical path lengths (inherent).

With regard to claim 16, Chang et al. disclose the invention as claimed, said "...a polarization rotator for controlling an equivalent angle of said birefringent element assembly." limitation being met by Chang et al. in the same manner as that taught by the instant invention, as well as wherein the spatial birefringent element (identified as above) first separates an optical beam (404) into two orthogonally polarized components, each of the two components traveling along separate paths of different optical path lengths (see element 400) such that when the two components recombine at the output of the spatial birefringent element a birefringent effect is achieved (in the

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same manner as that achieved by the instant invention). (That is, said equivalent angle has been interpreted broadly as reading on, inter alia, the angular disposition of said birefringent element assembly as a whole.)

With regard to claim 17, said polarization rotator of Chang et al. (e.g., element 402) is a half-wave plate. See col. 5, l. 38.

With regard to claim 18, the structural element teachings of Chang et al., set forth hereinbefore, inherently meet the method teachings recited in this claim.

With regard to claim 21, Chang et al. disclose, as set forth hereinbefore, the claimed subject matter. See Fig. 4a.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 2 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chang et al. (6,335,830) in view of Applicant's Admitted Prior Art.

With regard to claim 2, Chang et al. disclose the invention as set forth above **EXCEPT FOR** an explicit teaching wherein, with respect to claim 2, said interleaver as recited in claim 1 further

comprises a polarization rotator configured to align the two components prior to the two components being transmitted back through the birefringent element assembly such that approximately zero dispersion is obtained in an output of the interleaver. Applicant's Admitted Prior Art (see specification: ¶[0012], pp. 4-5), however, expressly acknowledges that "...contemporary interleavers have dispersion versus wavelength curves which have zero dispersion value at a particular wavelength, such as at the nominal channel center wavelength..." an admission that, absent further limiting language in these claims, would have made it obvious to one having ordinary skill in the art at the time the invention was made to have anticipated either that the interleaver of Chang et al. would function such that approximately zero dispersion would be obtained in an output of said interleaver or that changes to same to effect such performance would be called for, for at least the purpose of mitigating dispersion in the output of said interleaver.

With regard to claim 5, the combination teaches wherein said polarization rotator comprises a half-wave plate. See Chang et al.'s element 402.

5. Claims 9, 11, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chang et al. (6,335,830).

With regard to claims 9 & 11, Chang et al. disclose the invention as set forth above, including wherein said first birefringent element has an equivalent angular orientation of 45° (col. 5, ll. 38-41) and having a phase delay of Γ (inherent) **EXCEPT FOR** explicit teachings of the following:

wherein said second birefringent element has an equivalent angular orientation of -21° and having a phase delay of 2Γ ; and

said third birefringent element has an equivalent angular orientation of 7° and having a phase delay of 2Γ .

It is notoriously old and well-known in the optical filter art, however, to assemble optical systems (Solc filter systems, for example) in which first, second, and third birefringent elements respectively have the above-recited equivalent orientations. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the invention of Chang et al. such that said second and third birefringent elements be disposed having the above-recited equivalent orientations, for at least the purpose of allowing a passband of said interleaver to be flattened to a selectable degree, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

With regard to claim 20, Chang et al. meet the claimed limitations as same are presently recited. Please see above.

6. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chang et al. (6,335,830) in view of Lahat et al. (6,417,944).

Chang et al. disclose the invention as set forth above **EXCEPT FOR** an explicit teaching wherein said interleaved channels have spacing [read: spacings] which is [read: are] tunable.

Lahat et al., however, explicitly disclose wherein interleaved channels have spacings which are tunable. See col. 8, ll. 9-15. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified, if necessary, the interleaver of Chang et al. such that its interleaved channels have spacing that were tunable, as expressly taught by Lahat et al., for at least the purpose of optimizing the performance of said interleaver vis-à-vis adequate channel separation, &c.

Double Patenting

7. **Claims 1, 2, 7-16, 18, 20, and 21 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 24-49 of copending Application No. 09/891,795.** Although the conflicting claims are not identical, they are not patentably distinct from each other because, where not outright identical, the claims are sufficiently similar so as to be reasonably subject to obviousness-type double-patenting rejection.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

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Response to Arguments


8. Applicant's arguments with respect to claims 1, 2, 7-16, 18, 20, and 21 have been fully considered, but have been rendered moot in view of the new ground(s) of rejection set forth hereinbefore.

Contact Information

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Craig Curtis, whose telephone number is (571) 272-2311. The facsimile phone number for Art Unit 2872 is (703) 872-9306.

Any inquiry of a general nature regarding the status of this application should be directed to the Group receptionist, whose telephone number is (703) 308-0956.

C.H.C.
Craig H. Curtis
Group Art Unit 2872
28 May 2004



Audrey Chang
Primary Examiner
Technology Center 2800